

National Association of State Emergency Medical Services Officials



Rural Highway Mass Casualty Guidelines

Resources for State and Local Officials

November 2011



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BACKGROUND: Why These Guidelines Came About

This project was executed as the result of the 2008 Mexican Hat motorcoach crash in which 50 of 53 bus passengers were ejected, 43 of whom were injured – many seriously, and nine fatally. The roll-over occurred in a remote area challenged by limited access to communications, emergency medical response, ground and air medical transport services and hospital capacity, particularly trauma centers. Following its investigation of the Mexican Hat crash, the **National Transportation Safety Board (NTSB)** made several recommendations surrounding motorcoach and roadway safety, including one to the **Federal Interagency Committee on Emergency Medical Services (FICEMS)**:

“Evaluate the system of emergency care response to large-scale transportation related rural accidents and, once that evaluation is completed, develop guidelines for emergency medical services response and provide those guidelines to the States. (H-09-5)”

It is specifically that language that led the **US DOT National Highway Traffic Safety Administration (NHTSA)** to fund this effort through the **National Association of State Emergency Medical Services Officials (NASEMSO)** and request these guidelines to meet the obligations of FICEMS to NTSB. The guidelines were made possible as a result of a project funded by the NHTSA during which two tools were created that are described in these guidelines. In 2010, NASEMSO brought together representatives from American Association of State Highway and Transportation Officials, the Governors Highway Safety Association, NHTSA, Federal Highway Administration, and additional subject matter experts in highway safety, emergency medical services (EMS), trauma systems, emergency communications and others in an effort to create tools designed to quantify and measure readiness to respond to large scale highway incidents. The intent of the guidelines is to inform state EMS officials about these resources given their critical role in making improvements in the EMS system response to transportation related rural incidents involving multiple casualties.

THE PROBLEM: Motorcoach Crashes in Rural Areas Occur Frequently and Emergency Care Systems May Not Be Optimally Prepared to Handle Them

A National Highway Traffic Safety Administration (NHTSA) study published in 2005 found that nearly 60 percent of fatal crashes occurred on rural roads, despite the fact that rural roads incur only 39 percent of the total vehicle miles traveled and less than 20 percent of the US population lives in rural areas. The frequency of fatal crashes involving large buses, often referred to as motorcoaches, was documented through the NHTSA Fatal Accident Reporting System (FARS) as occurring an average of 137 times a year during the period from 2000 to 2007, with less than 25 percent of these occurring in rural areas. Despite comprising less than a quarter of those fatal crashes, the rural incidents accounted for 56 percent of the fatalities and 72 percent of the non-fatally injured victims.



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According to FARS data, over 220 Mass Casualty Incidents (MCIs) involving fatalities occurred in 2009. Over 2000 people were involved, injured or killed in these crashes. In 2007, fatal crashes comprised less than 1 percent of all crashes that were reported that year (NTSB, 2009). Unfortunately, no reliable data source exists about motorcoach crashes involving serious injuries without deaths; anecdotal information from EMS system officials suggests that in rural and remote areas, these types of mass casualty incidents occur with alarming frequency.

Performance measures do not exist to quantify the adequacy of emergency medical response to mass casualty incidents in rural areas. A considerable amount of federal resources have been disbursed to establish and improve state and local capacity to respond to chemical, biological, radiological, nuclear, and explosive incidents as well as induced or communicable disease outbreaks, but until now no federal program has made EMS and the emergency care system of hospitals and trauma centers capacity to respond to rural highway crashes resulting in mass casualties a priority. While the important work related to public health preparedness has undoubtedly yielded system improvements that would be of benefit in a rural roadway-based mass casualty incident, the motorcoach crash scenario has many idiosyncrasies and unique challenges that are otherwise unaddressed.

EMS system subject matter experts assert that rural areas of the United States suffer from a lack of adequate prehospital response capacity. The majority of states' Emergency Medical Services Offices have mechanisms to assess the numbers and types of EMS personnel, vehicles, and related resources that are expected to be in place as a result of inspection and licensure processes. This is rarely done in a geocentric manner that relates those data to proximity to high-risk rural roads and rural highways regularly used by motorcoaches. Furthermore this measure of EMS and emergency care system capacity has never been quantified on a nationwide basis using a standardized measurement method.

In addition to mobile (e.g., ambulance) and fixed (e.g., hospital) emergency care resources, interagency planning and incident response practices are critical to optimal outcome for victims of rural highway crashes, especially those that result in multiple injured patients that would otherwise overwhelm the system in the immediate vicinity of the crash. Prior to this project, no comprehensive development of planning and on scene practices specific to rural highway mass casualty incidents had occurred. As a result, it is not possible to compare actual system performance to anticipated performance or actual planning and intended on scene practices against a promising standard.



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GUIDELINES FOR STATES

Guideline 1: Evaluation of EMS System Readiness

The **EMS Incident Response and Readiness Assessment (EIRRA)** is a *self-assessment tool designed to measure the level of emergency medical preparedness for response to a rural highway mass casualty incident*. It is intended to be used by state, regional and local EMS agencies to evaluate the system's capability to respond to large scale emergency incidents. In early 2011, **EIRRA** was completed and subsequently utilized by 28 state EMS offices to assess their respective overall preparedness levels. These initial EIRRA scores can be used as a baseline to identify where resources are lacking and to quantify progress after system improvements are made. EIRRA results could also be used as part of the highway safety planning prioritization process and the identification and selection of Highway Safety Improvement Program projects.

This guideline encourages all states, regional EMS systems, and local EMS agencies to complete EIRRA using a multidisciplinary group including EMS, area highway maintenance and operations personnel, law enforcement, fire/rescue, and emergency management personnel with responsibility for rural highway response in the area being evaluated. States that initially completed EIRRA upon its release are encouraged to redo the assessment at periodic intervals in order to identify areas where advancement has been made and others where improvement efforts are warranted.

EIRRA is comprised of **Benchmarks, Indicators and Scoring**. The benchmarks are *broad goals or expectations* of a fully prepared system. Indicators are *components of the benchmark* or the broad goal. Scoring breaks the indicator into *completion steps* and can mark progress in reaching a milestone. EIRRA contains seven (7) benchmarks (8 if adding the statewide assessment), and 33 indicators (35 if adding the statewide assessment). Most of the 33 indicator categories are divided into sub-indicators. An example of the benchmarks is shown below.

Personnel Benchmark: There are sufficient numbers, types and distribution of prehospital emergency medical and support personnel who are well-trained and supported for responding to mass casualty incidents. EMS personnel operate within a culture of safety, and are supported with high quality medical directors who have an integral role in mass casualty response.

To measure a rural EMS system's progress in meeting the personnel benchmark, there are four (4) indicators, which have been further divided into sub-indicators. The first Indicator of the Personnel Benchmark is "Human Resource Availability." It is divided into seven (7) sub-indicators, each represented with a scoring table. The first sub-indicator table is shown below.



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Indicator: 101. Human Resource Availability

| Indicator | Scoring |
|--|--|
| <p>Sub-Indicator: 101.1. Patient Care Personnel (BLS) - Basic Life Support levels of EMS personnel (first/emergency responders, Basic EMTs) are available in sufficient numbers throughout the area being evaluated.</p> | <p>0 Not known</p> <p>1 There are no EMS personnel in the area (e.g. frontier areas).</p> <p>2 There is a minimal number of BLS personnel in the area (primarily dispatch triggered first responders and a few Basic-EMTs).</p> <p>3 There is limited availability of BLS personnel (a mix of Basic-EMT scheduled on-call/on duty and dispatch triggered first responders).</p> <p>4 There are substantial numbers of BLS personnel (primarily Basic-EMT scheduled on-call /on duty with some dispatch triggered first responders).</p> <p>5 There is comprehensive coverage of BLS personnel (full coverage of Basic-EMTs in the area).</p> |

The multidisciplinary evaluation team conducting the self-assessment discusses the subindicator, scoring descriptions, and reaches consensus on the number in the right-hand column which most closely matches the area being assessed. It is important to note that examples (usually in parentheses) associated with scoring levels are meant to guide the evaluation team. In most cases, the description or example will not be an exact match to the area situation. The evaluation team members will have to use their judgment in approximating the score that best fits. An Excel spreadsheet is available to capture the responses; it automatically calculates the median scores for indicators and categories overall allowing for immediate identification of areas of strengths and weakness.



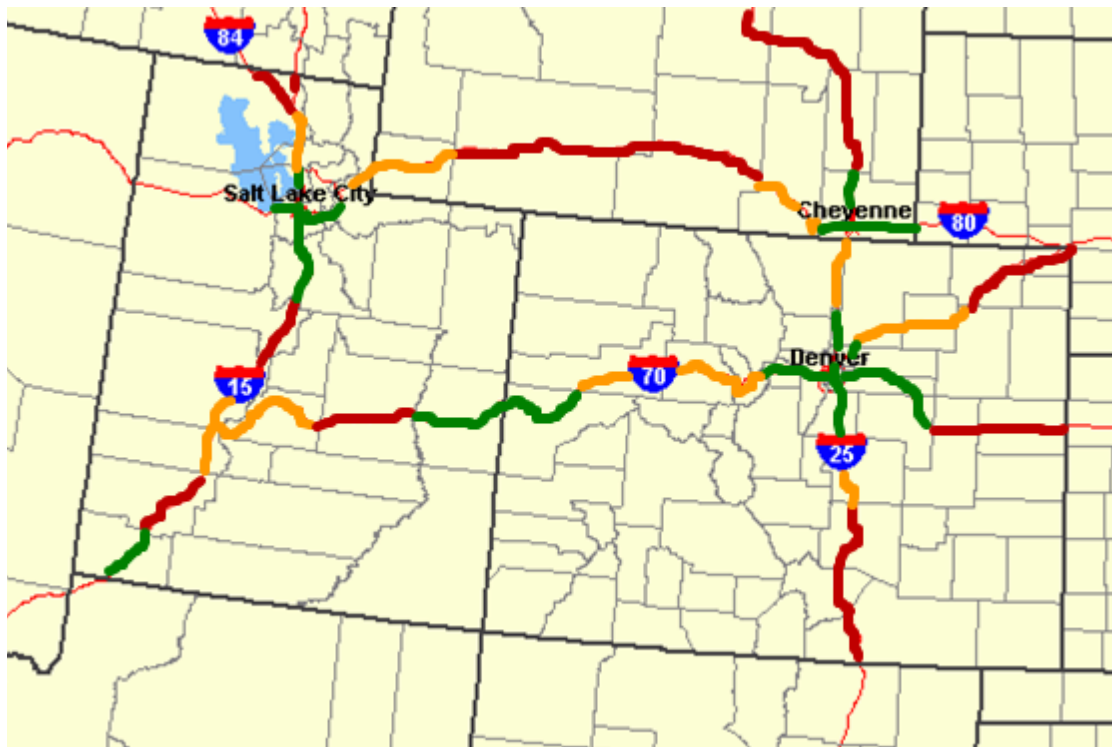
Guideline #2: Prepare to Quantify Resources on a Geographic Basis

The **Model Inventory of Emergency Care Elements (MIECE**, pronounced “mice”) is another emergency response measurement tool, but is at an earlier stage of development. Completed in 2011, the MIECE *Proof of Concept* was designed to demonstrate the feasibility and utility of *an emergency care inventory that displays resources and capacity by segment of interstates and US highways*. If developed into a full scale project, MIECE would include a scorecard-like assessment of emergency care resources by geographic area. These data could ultimately be used to create a snapshot in time or dynamic real-time “dashboard” where highway officials, EMS officials, motor coach route planners, and even the public could look at a regularly updated highway map and see the capability of the emergency medical and hospital care system in the area.

MIECE is envisioned as a tool to measure the emergency medical services (EMS) system’s capability to respond to mass casualty incidents within a given geographic area. This model inventory includes measurable characteristics of the emergency care system, such as ground EMS agencies, rescue services that provide vehicle extrication, helicopter emergency medical services, hospitals and designated trauma centers, and many others. MIECE’s matrix of data elements is modeled after the US Department of Transportation’s Model Inventory of Roadway Elements (MIRE), which is also a geographically organized resource inventory using defined characteristics intended to contribute to risk assessment, system improvement, and retrospective analysis. By measuring and scoring these EMS characteristics along segments of our nation’s roadways, a visual representation of the EMS system’s capabilities could be displayed.

Below is a fictitious example of how a **MIECE** color-coded road map might appear:

- **Green** – high level of emergency care resources
- **Yellow** – medium level of emergency care resources
- **Red** – low level of emergency care resources



Six categories of resources are anticipated to be measured in order to assess the type and proximity of EMS and emergency care resources associated with segments of roadways. Thirty nine (39) data elements can be found within the six categories, the details of which can be found in the MIECE Proof of Concept document. This Guideline calls for the preparation of state EMS offices to collect and deposit this information once a system has been developed for the capture of these data and the display of the classification results. The six categories are:

1. Personnel
2. Transportation
3. Communications
4. Equipment/Inventory
5. Medical Facilities
6. Other

States should consider where and how their periodic regulatory activities create an opportunity to capture this information, such as annual EMS agency license renewal processes and inspections. Finally, states should consider participating in future design, pilot and implementation of MIECE.



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Guideline #3: Engage and Educate Partners

State EMS Officials are uniquely positioned to educate stakeholders in other disciplines about the risk of travel in rural areas on motorcoaches, post-crash resource availability and the relationship of the latter to avoidance of fatalities and optimal patient outcome.

This guideline recommends that state EMS officials take a leadership position in the adoption and further development of the EMS Incident Response and Readiness Assessment (EIRRA) and Minimum Inventory of Emergency Care Elements resources in their states. This should occur through presentations at state EMS advisory council or board meetings, focused interaction with counterparts in state highway safety offices, presentations to state highways safety planning groups, and to colleagues in state based traffic incident management initiatives.

This guideline also recommends that state EMS officials distribute EIRRA to regional and local EMS systems and encourage its use at those levels. Ideally (in the absence of a national system being created to do so), a state would create a mechanism by which this information could be aggregated for use at the state level to prioritize improvement initiatives and for local and regional self-comparison to similar systems or to statewide values.

CONCLUSION: State EMS Officials Can Contribute to Reduction of Death and Disability Resulting from Rural Highway Mass Casualty Incidents

The preparation for and use of these tools is a promising opportunity to complement the traditional education, enforcement, and engineering approaches to assuring roadway safety in all settings. Given the frequency and criticality of motorcoach crashes in the United States, EMS system planning and capacity is a critical component of post crash interventions not previously explored in this detail.

Personnel in every state EMS office can generally describe where they would least like to have a highway crash. This tool would bring that same situational awareness to travelers, enabling them to adjust their plans accordingly. It would also provide critical information to state and local officials, highway safety administrators, and planners by targeting where emergency care system improvements are most needed. The resulting increase in system capability could ultimately save lives and reduce injuries by enhancing access to emergency care.

In addition to the dissemination of these guidelines to state EMS officials, NASEMSO will house them and the related MIECE and EIRRA documents in a publicly accessible area of its website. State EMS officials are encouraged to engage in further distribution of these guidelines at the state and local level and serve as a champion for their implementation.